

FORM PTO-1390
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

SAIC 18.749

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5

09/868160

INTERNATIONAL APPLICATION NO.
PCT/EP00/11883

INTERNATIONAL FILING DATE
28 NOVEMBER 2000 (28.11.00)

PRIORITY DATE CLAIMED
06 DECEMBER 1999 (06.12.99)

TITLE OF INVENTION
Fabric Reinforced Rubber for Sheet for the Production of Slabs of Resin Hardened Finely Divided Stone Material

APPLICANT(S) FOR DO/EO/US

Luca TONCELLI

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

**Any fee due with this paper, not fully covered
by an enclosed check, may be charged on
Deposit Acct. No. 08-1634.**

**Filed by Express Mail
(Receipt No. EL639692961US)
on June 13, 2001**

**pursuant to 37 C.F.R. 1.10.
by** *Doreen Davis*

09/868160

INTERNATIONAL APPLICATION NO
PCT/EP00/11883ATTORNEY'S DOCKET NUMBER
SAIC 18.74921. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**Neither international preliminary examination fee (37 CFR 1.482) -
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO **\$1000.00**International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO **\$860.00**International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$710.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO
but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$690.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO
and all claims satisfied provisions of PCT Article 33(1)-(4) **\$100.00****ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

\$ 1,000.00

\$

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).

CLAIMS NUMBER FILED NUMBER EXTRA RATE \$

Total claims 5 - 20 = 0 x \$18.00 \$ 0.00

Independent claims 1 - 3 = 0 x \$80.00 \$ 0.00

MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$270.00 \$

TOTAL OF ABOVE CALCULATIONS = \$ 1,000.00☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above
are reduced by 1/2. \$0.00 +**SUBTOTAL = \$ 1,000.00**Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)). \$**TOTAL NATIONAL FEE = \$ 1,000.00**Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property + \$**TOTAL FEES ENCLOSED = \$ 1,000.00**Amount to be
refunded: \$

charged: \$

- a. ☒ A check in the amount of \$ 1,000.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 08-1634. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card
information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

HELFGOTT & KARAS, P.C.
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Suite 6024
New York, New York 10118
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SIGNATURE

Aaron B. Karas

NAME

18,923

REGISTRATION NUMBER

FABRIC REINFORCED RUBBER FOR SHEET FOR THE PRODUCTION OF SLABS OF RESIN HARDENED
FINELY DIVIDED STONE MATERIAL

The present invention relates to the production of manufactured slabs composed of a granulate
or fine particles of stone material bonded with a hardening resin and, more specifically, to an
improvement to the production process therefor.

These slabs are produced using a method in which a mixture composed of granulate material of
selected particle size and synthetic resin is deposited in metered quantities on a conveyor belt
which is advanced to a forming station (in which it is subjected to a vacuum compaction
operation with simultaneous application of a vibratory movement of predetermined frequency)
and subsequently to a station for hardening of the resin (preferably by means of the action of a
catalyst and/or heat).

Upstream of the forming station, the upper surface of the mixture deposited on the conveyor
belt is covered with a sheet or layer of protective material, which prevents the pressing ram
from being soiled by the mixture.

In the past, this sheet of protective material was made of paper, the use of which, however, was
accompanied by certain secondary problems subsequent to the actual production process, but
nonetheless of considerable importance.

An improvement was subsequently introduced (described and claimed in Italian patent
application No. TV96A000007 filed on 29 January 1996), according to which the paper layer
or sheet is replaced by a sheet of resilient material, preferably rubber.

In this way, upon completion of the resinous binder hardening step, the rubber sheet can be
removed, by means of tearing, from the surface of the finished slab and subsequently reused.

In the preferred embodiment, the support on which the mixture is deposited before being
transferred to the vacuum and vibration compacting station is also protected by a similar sheet
of resilient material, in particular rubber.

After the forming step, the mixture deposited on the support and enclosed between the two
rubber sheets is in the form of a slab, at the edges of which the two protective rubber sheets are
joined together by overlapping their respective edges, substantially completely so as to enclose

the raw slab which has been formed but not yet subjected to the resinous binder hardening step.

Since during compaction a portion of the mixture, albeit minimal, inevitably forms a burr interposed between the two edges, after the resinous binder hardening step this burr forms incrustations on the rubber sheets, which are difficult to remove.

Again in the previously know method, a separating liquid is applied to the two edges which are intended to mate, immediately before use on the production line, with the purpose of preventing this problem and also of reducing the chemical ageing of the rubber.

In spite of these measures, however, operations to clean the two rubber sheets, and in particular the two mating edges, are still necessary.

Italian patent application No. TV97A000146 in the name of the same Applicant describes further improvements aimed at preventing the formation of incrustations on the rubber sheets, which require laborious cleaning operations, and involving modifications both to the shaping of the protective rubber sheets and to the operating process.

In the first place, the flat configuration of the lower sheet is replaced by a shaped configuration, comprising a flat base and a peripheral border projecting from said flat base over a predetermined height which is smaller by a predetermined amount than the height of the final slab to be produced, so that, after the compaction step, a gap of a predetermined thickness remains between the peripheral edge of the upper sheet and the top of the aforementioned border.

The excess mixture material penetrates into this gap of predetermined thickness during the vacuum vibration compacting step and this material then remains attached to the edge of the slab during the hardening step.

When, after the resinous binder hardening step, the final slab is released by tearing off the two rubber sheets, a hardened raw slab is obtained, said slab having peripherally a border of hardened material which can easily be removed during the normal finishing operations for a slab of stone material.

Patent application No. TV97A000146 also describes and claims a specific structure of the rubber sheet, in particular the lower sheet, to which the peripheral border is attached, said border defining the cavity for initial deposition of the metered quantity of mixture.

The said structure consists of two or more layers, usually four layers, such as:

a first layer of rubber (VRF, EPM, PU)

a first cloth or fabric of non-deformable material (Kevlar, polyester, nylon, aramide)

a second layer of rubber (EPM, NBR)

a second cloth or fabric of non-deformable material.

Preferably this cloth or fabric is subjected to preliminary treatments, such as a pretensioning treatment, to avoid subsequent hysteresis phenomena, a thermal stabilization, etc.

However, certain requirements remain in connection with the rubber sheets and must be satisfied in order to obtain optimum results.

In short, these requirements correspond to the following characteristics which the rubber sheet must have:

a resistance to heat and chemical agents so as to withstand operating temperatures which during the resin hardening step are in the region of 150°C;

a good resistance to abrasion and tearing;

(c) retain substantially unaltered properties over time;

(d) possess optimal mechanical properties so as to contain the mixture without undergoing excessive deformations;

undergo minimal shrinkage after forming so as to prevent the formation of surface irregularities in the final product;

a good heat conductivity in order to favour the hardening of the slab.

As regards the nature of the rubber, the most suitable are of a polymeric type resistant to temperature and to chemical agents, usually not for sulphur vulcanization, in particular synthetic rubbers known as EPM (ethylene and propylene copolymers), VKF (fluorocarbon rubbers) and PU (polyurethane rubbers).

Even the use of the previously mentioned composite structure, consisting of a layer of cloth or fabric interposed in the rubber sheet and then embedded or inset therein, does not completely solve the problem.

In fact, even if the rubber sheet is in this way able to contain the mixture during the forming step without undergoing excessive deformation, the final product has surface corrugations, as a

result of the shrinkage of the material during the cooling phase and the - albeit minimal - residual elasticity of the rubber.

It has now been discovered that all these problems can be completely and satisfactorily solved with a rubber sheet structure of the type comprising four layers of rubber between which a layer of non-deformable cloth or fabric is interposed, said structure being characterized in that the base of the composite sheet is completed with a second layer of cloth or fabric consisting of non-deformable material, which thereby constitutes the outwardly directed surface. The second layer of cloth or fabric also constitutes an outwardly directed surface which is suitable for being in contact with the oven surface.

The specific aspects and advantages of the composite structure in accordance with the present invention will appear more clearly from the following description, with reference to the drawings in which:

Figure 1 coincides with Fig. 3 of Italian application No. TV97A000148, illustrating therefore the structure of the rubber sheets which was used in the previously mentioned method;

Figure 2 is a view, similar to that of Figure 1, of the composite structure in accordance with the present invention; and

Figure 3 is an enlarged cross-sectional view of the composite structure of the present invention corresponding to position A in Fig. 2.

It can be seen that Figure 1 corresponds to Figure 3 of Italian patent application No. TV97A000148, which should be referred to for a detailed description.

It can be seen from this figure that the starting mixture 130 is deposited in a cavity defined by a lower sheet 120 and by an upper or covering sheet 132.

A perimetral border 120A, the inner surface of which has a predetermined inclination, is attached to the lower sheet 120.

In Figure 1, the sheet 120 has a composite structure consisting of a lower sheet of rubber 120 having a flat basis 120B and an inclined peripheral border 120A, a layer 120M of substantially inextensible cloth or fabric (such as Kevlar, polyester or nylon) is embedded and an upper sheet of rubber 132 which is spaced from the said border 120A through a gap 100 of a predetermined thickness along its peripheral edge 132A. The end portion 120E of the slab, which is enclosed

between the inclined surface 120C and a vertical cross-section defined by the line 120D, is the scrap material to be removed at a subsequent step of the manufacturing process. References X and S designate the thickness of the said peripheral border 120A resp. of the mixture 130.

With reference now to the composite structure of the present invention, shown in Figures 2 and 3, using where possible the same references as in Figure 1 and making particular reference to Figure 3, the sheet 120 comprises two layers of rubber 220A and 220B, between which the layer of inextensible cloth or fabric 220M is interposed.

As previously mentioned, the rubber of the layers 220A and B is an EPM rubber which is vulcanised by means of a peroxide using a known method.

The selected rubber preferably has the following characteristics:

Density	1.05 g/cm ³
Hardness	64 Shore (A)
Abrasion resistance	86 mm ³
Heat resistance	170°C

The rubber is worked in such a way to achieve a maximum controlled planarity of 0.5 mm per linear metre, reaching the overall thickness of 4 mm.

In turn, the cloth or fabric of the layer 220M preferably is of the type comprising a weft of polyamide or nylon and a warp of polyester, and is pretensioned in both directions (both weft and warp).

As can be seen from Figure 3, a second layer of cloth or fabric 220N having the same characteristics as the layer 220M is added underneath the rubber layer 220B.

The composite sheet, thus formed, is preferably subjected to a stabilising treatment prior to use, consisting of heating for a few hours (generally from 1 to 3 hours) to a temperature higher than the maximum operating temperature, so that, in the present method (in which resin hardening takes place at a temperature in the region of 150°C), the stabilising temperature is in the region of 160°C (for approximately 2 hours).

The desired results can be obtained with the sheet structure in accordance with the present invention.

In particular, it is desirable that both the lower sheet 220 and the upper sheet should have the

same structure, so as to guarantee perfect homogeneity of thermal exchange with the mixture contained in the "sheath" defined by the two - upper and lower - rubber sheets.

Moreover, the lower cloth 220N also favours the handling of said sheath containing the mixture through the various stations of the slab production plant.

In particular, it is worth noting that with the structure according to the present invention the compressive strength or rather the resistance to extreme loads of the moulding sheath is increased, preventing the appearance of wrinkles on the surfaces of the product.

1997-1998		1998-1999		1999-2000		2000-2001		2001-2002		2002-2003		2003-2004		2004-2005		2005-2006		2006-2007		2007-2008		2008-2009		2009-2010		2010-2011		2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2030-2031		2031-2032		2032-2033		2033-2034		2034-2035		2035-2036		2036-2037		2037-2038		2038-2039		2039-2040		2040-2041		2041-2042		2042-2043		2043-2044		2044-2045		2045-2046		2046-2047		2047-2048		2048-2049		2049-2050		2050-2051		2051-2052		2052-2053		2053-2054		2054-2055		2055-2056		2056-2057		2057-2058		2058-2059		2059-2060		2060-2061		2061-2062		2062-2063		2063-2064		2064-2065		2065-2066		2066-2067		2067-2068		2068-2069		2069-2070		2070-2071		2071-2072		2072-2073		2073-2074		2074-2075		2075-2076		2076-2077		2077-2078		2078-2079		2079-2080		2080-2081		2081-2082		2082-2083		2083-2084		2084-2085		2085-2086		2086-2087		2087-2088		2088-2089		2089-2090		2090-2091		2091-2092		2092-2093		2093-2094		2094-2095		2095-2096		2096-2097		2097-2098		2098-2099		2099-2100		2100-2101		2101-2102		2102-2103		2103-2104		2104-2105		2105-2106		2106-2107		2107-2108		2108-2109		2109-2110		2110-2111		2111-2112		2112-2113		2113-2114		2114-2115		2115-2116		2116-2117		2117-2118		2118-2119		2119-2120		2120-2121		2121-2122		2122-2123		2123-2124		2124-2125		2125-2126		2126-2127		2127-2128		2128-2129		2129-2130		2130-2131		2131-2132		2132-2133		2133-2134		2134-2135		2135-2136		2136-2137		2137-2138		2138-2139		2139-2140		2140-2141		2141-2142		2142-2143		2143-2144		2144-2145		2145-2146		2146-2147		2147-2148		2148-2149		2149-2150		2150-2151		2151-2152		2152-2153		2153-2154		2154-2155		2155-2156		2156-2157		2157-2158		2158-2159		2159-2160		2160-2161		2161-2162		2162-2163		2163-2164		2164-2165		2165-2166		2166-2167		2167-2168		2168-2169		2169-2170		2170-2171		2171-2172		2172-2173		2173-2174		2174-2175		2175-2176		2176-2177		2177-2178		2178-2179		2179-2180		2180-2181		2181-2182		2182-2183		2183-2184		2184-2185		2185-2186		2186-2187		2187-2188		2188-2189		2189-2190		2190-2191		2191-2192		2192-2193		2193-2194		2194-2195		2195-2196		2196-2197		2197-2198		2198-2199		2199-2200		2200-2201		2201-2202		2202-2203		2203-2204		2204-2205		2205-2206		2206-2207		2207-2208		2208-2209		2209-2210		2210-2211		2211-2212		2212-2213		2213-2214		2214-2215		2215-2216		2216-2217		2217-2218		2218-2219		2219-2220		2220-2221		2221-2222		2222-2223		2223-2224	
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CLAIMS

1. Moulded rubber sheet structure for use in the process for production of slabs as above defined, of the type comprising two layers of rubber between which a layer of non-deformable cloth or fabric is interposed, characterized in that the base of the composite sheet is completed with a second layer of cloth or fabric of non-deformable material, which thereby constitutes the outwardly directed surface of the rubber sheet, said composite structure being moreover dimensionally stabilised by heating to a temperature in the region of 160°C.
2. Rubber sheet structure according to Claim 1, characterized in that said rubber is of the EPM or VKF or PU type.
3. Rubber sheet structure according to Claim 1, characterized in that the two - lower and upper - moulding sheaths have the same structure, as regards the homogeneity of heat transfer.
4. Rubber sheet structure according to Claim 1, characterized in that said cloths are formed by a polyester warp and a nylon weft.
5. Rubber sheet structure according to Claim 1, characterized in that said heating to a temperature in the region of 160°C is performed for 1-3 hours.

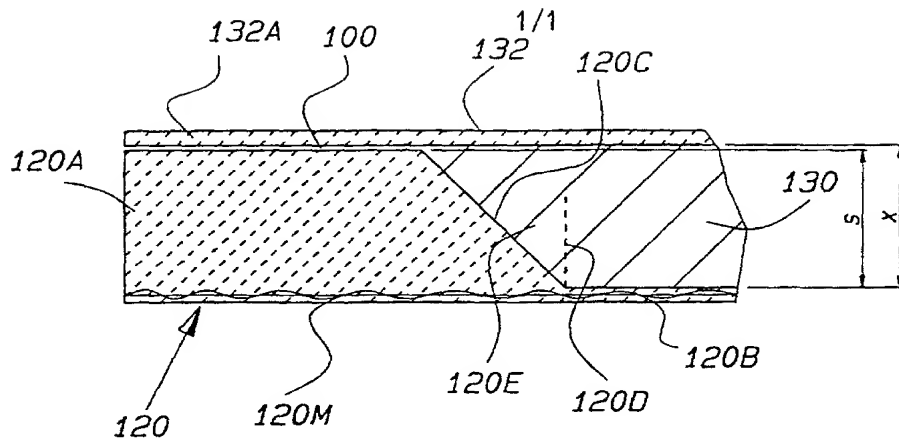


Fig. 1

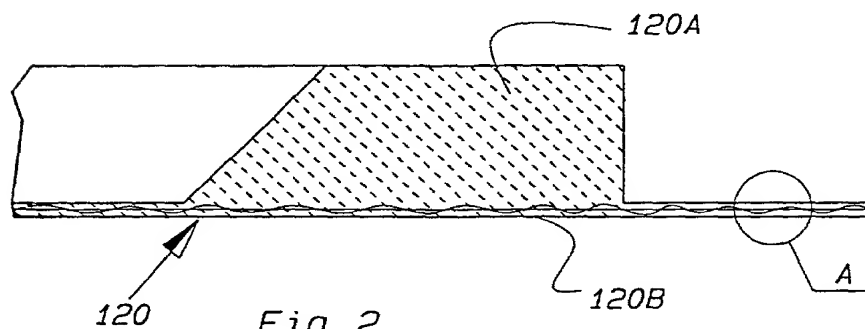


Fig. 2

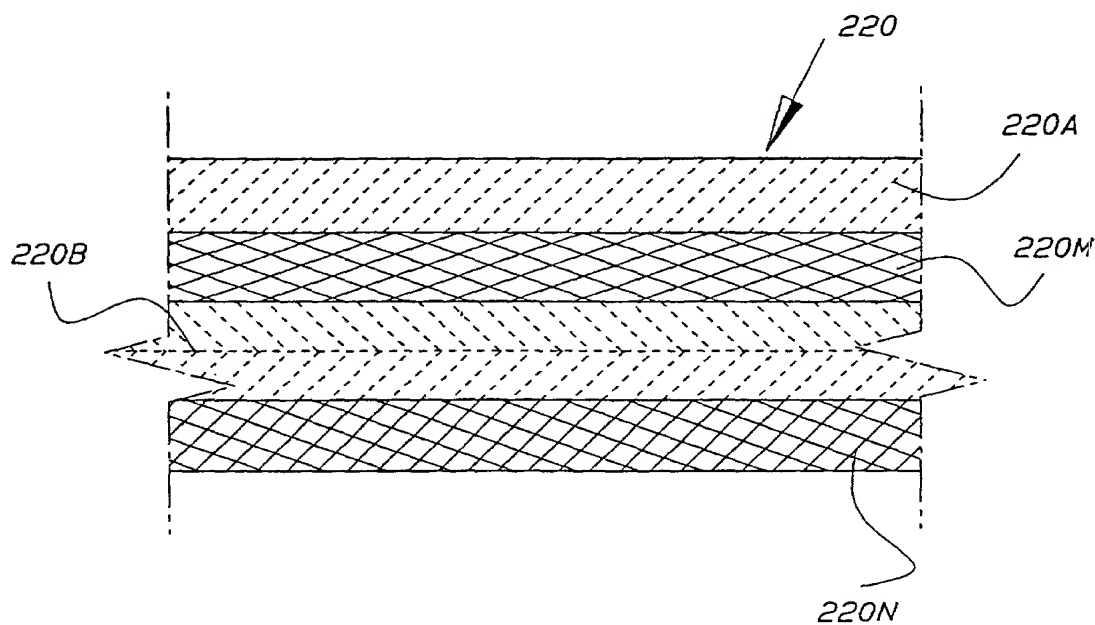


Fig. 3

UNITED STATES
DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: Fabric reinforced rubber for sheet for the production of slabs of resin hardened finely divided stone material.

the specification of which

(check one)

☒ is attached hereto

☐ was filed on _____ as

Application Serial No. _____

and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
TV99U000055.	ITALY	06 December 1999	Yes No
(Number)	(Country)	(Day/Month/Year Filed)	
			Yes No
(Number)	(Country)	(Day/Month/Year Filed)	
			Yes No
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing Date) (Status-patented, pending, abandoned)

(Application Serial No.) (Filing Date) (Status-patented, pending, abandoned)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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UNITED STATES
DECLARATION FOR PATENT APPLICATION

Full name of fourth joint inventor, if any _____
Fourth Inventor's Signature _____ Date _____
Residence _____ Citizenship _____
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Full name of fifth joint inventor, if any _____
Fifth Inventor's Signature _____ Date _____
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